

In re: Duvick *et al.*  
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### REMARKS

Claims 1-33 are pending in the application. No new matter has been added by way of amendment. As requested by the Examiner, the claims have been amended to incorporate reference to particular SEQ ID NOs to specifically define the first and second nucleotide sequences of the claims. As requested by the Examiner, Applicants are submitting herewith copies of an alignment of second nucleotide sequences of the claims (SEQ ID NO:12 vs. SEQ ID NO:14) showing 41% sequence identity between the sequences and copies of an alignment of first nucleotide sequences of the claims (SEQ ID NO:16 vs. SEQ ID NO:28) showing 74% sequence identity between the sequences. Reexamination and reconsideration of the claims are respectfully requested.

### The Invention

The invention relates to compositions and methods for detoxification or degradation of fumonisin or AP1. The enzymes and nucleotide sequences of the present invention provide a means for continued catabolism of the fumonisin-degradation products obtained by degradation with other enzymes, such as, for example, previously-described carboxylesterase and amine oxidase enzymes.

As suggested by the Examiner, Applicants have amended the claims so as to define all the nucleotide sequences of the claims in relation to particular sequences disclosed in the specification as SEQ ID NOs. However, Applicants reiterate that they believe that the claims as previously submitted described the invention so as to meet the enablement and written description requirements. The invention involves the use of the novel secondary nucleotide sequences in conjunction with enzymes having fumonisin esterase activity or amine oxidase activity such as those previously described and cited in the specification. Because the enzymes having fumonisin esterase activity or amine oxidase activity were previously described and known in the art, Applicants believe that the description of those sequences as previously claimed met the written description requirement. See, e.g., *Amgen, Inc. v. Hoechst Marion Roussel*, 314 F.3d 1313, 65 USPQ2d 1385 (Fed. Cir. 2003) (noting that the written description

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requirement may be satisfied if the disclosed function is sufficiently correlated to a particular structure known in the art).

Nevertheless, in order to advance prosecution, Applicants have amended the claims as suggested by the Examiner. Applicants therefore respectfully submit that the claims meet the requirements for patentability and should be allowed.

**Consideration Of Previously Submitted Information Disclosure Statement**

It is noted that initialed copies of the PTO Forms 1449 that were submitted with Applicants' Information Disclosure Statement filed June 15, 2001 and December 11, 2002 have not been returned to Applicants' representative. **ACCORDINGLY, IT IS RESPECTFULLY REQUESTED THAT AN INITIALED COPY OF THESE FORMS 1449 BE FORWARDED TO THE UNDERSIGNED WITH THE NEXT COMMUNICATION FROM THE PTO.** In order to facilitate review of the references by the Examiner, copies of the Information Disclosure Statement and the Forms 1449 are attached hereto. Applicants note that the IDS of June 15, 2001 has been included in mailings to the PTO *three times*. Copies of the cited references were provided at the time of filing the original Information Disclosure Statement, and, therefore, no additional copies of the references are submitted herewith. Applicants will be pleased to provide additional copies of the references upon the Examiner's request if it proves difficult to locate the original references.

**CONCLUSION**

In view of the above amendments and remarks, Applicants respectfully submit that this application is now in condition for allowance. Early notice to this effect is solicited.

If in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject Application, the Examiner is invited to call the undersigned.

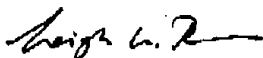
It is not believed that extensions of time or fees for net addition of claims are required, beyond those, which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of

RTA01/2136402v1

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this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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#### CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the US Patent and Trademark Office at facsimile number (703) 746-5249 on the date shown below.

  
\_\_\_\_\_  
Leigh W. Thorne

May 8, 2003  
Date

## Gap Results

GAP of: SEQ ID NO 14 check: 5189 from: 1 to: 1800  
to: seq id 12 check: 79 from: 1 to: 1936  
Symbol comparison table: nwsgapdna.cmp CompCheck: 8760

Gap Weight: 50 Average Match: 10.000  
Length Weight: 3 Average Mismatch: 0.000

Quality: 6541 Length: 1960  
Ratio: 3.634 Gaps: 10  
Percent Similarity: 40.541 Percent Identity: 40.541

Match display thresholds for the alignment(s):

| = IDENTITY  
: = 5  
. = 1

SEQ ID NO 14 x seq id 12 May 6, 2003 15:05 ..

```
1 .....ACT 3
1 GCGGATCCGTTTTTTTTTTTTTTTCTTAAGTTCGACTACCCACTTGCT 50
4 AGTGGATCATTGCATTGGCTGCGGACTGGCCCCCGATAGTCGTTGCGA 53
||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| |||
51 AGTCTCACACTAGCTCCAAGGGTATAAGTTCGACTCGAAGCTGCATCTCT 100
54 TGGTCGCGAGAATAAGCGTGCGAAGTGGGAGGATGTGAAGATGGGGGCCA 103
|| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| |||
101 CCGTGAAACATGGCAATAGTTTTTGTAGACAGATCCATCAACCGAGTACA 150
104 GGAGTATGTGTGCGGACCGTTTCGGACGCTTCTGCATTGGCTTGGCTTCA 153
|| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| |||
151 CGATGCCGTCAAGGTACATTCTCTCTTGGCTCCTCACCTGCTTTTGGGC 200
154 TCGGTTGCCGTGACTCTAGGGGGAGCCTCCGCCCGCGCGCGCAACCGC 203
|| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| |||
201 ATTGCTTTTGGCTCACGATGCGGGTCGTCTGCTCCTACTGTCAAGATTGA 250
204 GACCGATTTTCCGGTCCGCAGGACCGAT.....CTGGGCCAGGTTCA 245
|| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| |||
251 TGCTGGGATGGTGGTCGGCACGACTACTACTGTCCCCGGCACCCTGCGA 300
246 GGGACTGGCCCGGGACGTGATGAGCTTTGCGGGAATACCCATAGC....A 291
|| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| |||
301 CCGTCAGCGAGTTCTTGGGCGTTCCTTTGCGCGCTCTCCGACACGATTT 350
292 GCGCCGCCGGTGGCGGGCTGCGTTGGAAGCCGCCCAACACGCCCGGCC 341
||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| |||
351 GCGCCTCCTACTCGTCCCCTGCCCTTGGTCAACGCCTTTGCAAGCCACTGC 400
342 CTGGGCGGGCGTTCCGCCCGCCACCCAATTTGGCTCCGACTGCTTCGGCC 391
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401 ATATGGTCCAGCATGCCCTCAACAATTCAATTACCCCGAAGAACTCCGTG 450  
392 .....CGGCCCTATCTTCGCAAAGGCAGCCTCGCCCCCGGCGTGAGC 432  
451 ACATTACGATGGCCTGGTTCAATACACCGCCCCCGTCAGCTGGTGAAAAGT 500  
433 GAGGACTGTCTTTACCTCAACGTATGGGCGCCGTCAAGCGCTAAACCCGG 482  
501 GAGGACTGCCTGAACCTCAACATCTACGTCC...CAGGAAGTGAAGAACAC 547  
483 CCAGTACCCCGTCATGGTCTGGGTCTACGGCGGCGGCTTCGCCGCGGCA 532  
548 AAACAAAGCCGTCATGGTTTGGATATACGGTGGAGCGCTGGAATATGGTT 597  
533 CGGCCCGCCATGCCCTACTACGACGGCGAGGCGCT...TGCGCGACAGGGC 579  
598 GGAATTCATTCCACCTTTACGACGGGGCTAGTTTCGCAGCCAATCAGGAT 647  
580 CTCGTGCGGTGACGTTTAACTATCGGACGAACATCCTGGGCTTTTTCGC 629  
648 GTCATCGTCTGTGACCATCAACTACAGAACGAACATTCTGGGGTTCCTGC 697  
630 CCATCTCGGTCTCTCGCGCGAGAGCCCCACCGGAACCTTCGGGCAACTACG 679  
698 TGCCCCCTCAGCT.....TCCAATAACACAGCGAAATCTGG 732  
680 GCCTACTCGACATTCTCGCCGCTCTTCGGTGGGTGCAGAGCAACGCCCGC 729  
733 GGTTCCTAGACCAAAGGTTTGCTTTGGATTGGGTACAGCGGAACATCGCA 782  
730 GCCTTCGGAGGGGACCCCGGCGAGTGACGGTCTTTGGTGAATCGGCCGG 779  
783 GCCTTTGGCGGTGATCCTCGAAAGGTCAACAATTTGGGCAGAGTGCGGG 832  
780 AGCGAGCGGATCGGACTTCTGCTCACCTCGCCGCTGAGCAAGGGTCTCT 829  
833 GGGCAGAAGTGTGACGTCCTCTTGACGCTATGCCACACAACCCACCCT 882  
830 TCCGTGGCGCTATCCTCGAAAGTCCAGGGCTGACCGGACCGCTCGCGACG 879  
883 TCCGAGCAGCAATCATGGA...GTCCGGTGTGGCTAACTACAACTTCCCC 929  
880 CTCGCGACAGCGCCGCTCGGGCGAGCGCTCGACGCGGATCTTTTCGGC 929  
930 AAGGGAGATTGTCCGAACCTTGGAAACACCACTGTTCAAGCTCTCAACTG 979  
930 ACTGCGCTCGACCGACCCAGCCACCTGATGGCGCGCGCGACGCGGCCC 979  
980 TACCACCAGTATCGACATCTTGAGTTGTATGAGAAGAGTGCATCTCGCCA 1029  
980 GCGCGGCAATCGCGGGACCTGCGCAGGCGCGCTCCGACCGGACCGATCGTC 1029  
1030 CTCTGATGAACACGATCGAGCAACTCGGACTTGGGTTTGAATACAGTTG 1079  
1030 GATGGCCATGTGCTGCCGCGAGACCGACGCGCGCGATCGCGCGGGGCA 1079

1080 GACAACGTAACGGTTGTGTACCGTTCTGAAACGGCTCGCACGACTGGTGA 1129  
1080 GCTGGCGCCGGTTCCGGTCTGTATCGGAACCAATGCCGACGAAGGCCCGC 1129  
1130 CATTGCTCGTGTACCTGTTCTCGTCGGGACGGTGGCCAACGACGACTTC 1179  
1130 CCTTCCTCGGGCGCGCGCCGATGGAGACCCCAACGACTACCAAGCCTAT 1179  
1180 TCTTTGTCTCGGGGAGAATGACACCCAAACCATATCTCGAGGAGGCAATC 1229  
1180 CTGGAGGCGCAGTTTGGCGACCAAGCCGCCGCCGTGCGGGCGTGCTATCC 1229  
1230 CCGAATCAGCCCCGACCTTTACCAGACTCTCCTTGGAGCATATCCCATTTG 1279  
1230 CCTCGACGGCCGGGCCACGCCCAAGGAAATGCTCGCGCGCATCTTCGGCG 1279  
1280 ATCCCCAGGGATCGGATCGCCTCAAGATCAGATTGCCGCCATTGAGACCG 1329  
1280 ACAATCAGTTCAATCGGGGGTCTCGGCCCTTCTCGGAAGCGCTTGTGCGC 1329  
1330 AGGTAAAGATTCCAGTGTCTTCTGCCATCGTGGCTCAGGACTCCCGGAAT 1379  
1330 CAGGGCGCGCCCGTGTGGCCTTATCAGTTCAACGTAATACCGAGGGTGG 1379  
1380 CGGGGTATCCCTTCTTGGCGCTACTACTACAATGCCGACCTTTGAGAATCT 1429  
1380 AAGAGCGCCGGCTACCCACGGAGCCGAAATTCCCTACGTTTTCGGGGTGT 1429  
1430 CGAGCTTTTCCCTGGGTCCGAAGTGTACCACAGCTCTGAAGTCGGGATGG 1479  
1430 TCAAGCTCGACGAGTTGGGTCTGTTCAATTGCGCGCCCGAGGGGCCACG 1479  
1480 T...GTTTGGCACGTATCCTGTGCAAGTGGCAGCGCCTTGGAGGCCAG 1526  
1480 CCCGCCGACCGTCCGCTGGGCCAACTGATGTCTCCGCTGGGTCC... 1525  
1527 ACGAGCAAATACATGCAGGGTGCCTGGGCGGCCTTTGCCAAAACCCCAT 1576  
1526 GGTTCCGCAAGAAATGGCGACCCCGCCGGGACGCCCTTACCTGGCCTGCC 1575  
1577 GAATGGGCTTGGGTGGAACAAGTCCGAATGTCCGCGCGCTTGGCTCAC 1626  
1576 TATTCTACGGGCAAGTCGACCATGACATTCCGTCCCGAGGGCCGCGGGC 1625  
1627 CAGGCAAAGCCATCCAGGTTGACGTCTCTCCAGCGACAATAGACCAACGA 1676  
1626 GGTGGTGTGCGCCCGACCTTCCATCCCCCCTTGCBC. GGATGGCGCCAAG 1674  
1677 TGTGCCTTGTACACGCATTATTATACTGAGTTGGGCACAATCGCGCCGAG 1726  
1675 GCGGGGTGACGCCGTGACGATGGCGTGACGACGGTCGAGGCGATGTTCT 1724  
1727 GACATTTTGAGGACCAGGTATTGTACCTACAGCGGTTCCGAAAAGGAG 1776  
1725 CGATCTGGAGTCCGCGCGCCTCGATTGCGTCTCGGCGCTCAGAC 1774  
1777 GTATCTGCTGTCAATTGCGCCAGCCATCATTTGAAGAGTGCTGAAATTT 1826

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P. 014

1775 GAACGCCCCAGTTCCATCCACACAGT..... 1800  
| | | | | | | | | |  
1827 CATGGGGGAATATCCATCCATGCTCACATTAGCGCTTTTGGGAACATGGAC 1876

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.  
.

Sequences are 16 (*Exophiala*) and 28 (*Rhinocladella*)

414 + 50 = 464 divergent nucleotides in total

seq 28 is 1803 nt long

1803-464 = 1339

1339/1803 = 74.3% identity over the full length of seq id 28.

```
1 ATGBCACTTGCACCGAGCTACATCAATCCCCAAACCTCGCCTCCCCAGC 50
51 AGGGTATTCCACGTCGGCCTAGGCCCAAACGGAGGGAGGTATGCGACAA 100
101 TAGCTGGACAGATTGGACAAAGACGCTTCGGCCGTGACAGACCCTGCCTAC 150
151 GAGAAACAGGTTGCCCCAAGCATTGCCCCAACCTGCGAGCTTGTCTTGCTGC 200
201 AOTGGAGCCACTTCAAACGACATTACCAAGCTCAATTACTACATCGTCG 250
251 ACTACAACCCGAGCAAACTCACCAGCAATTGGAGATGGGCTGAAGGCTACC 300
301 TTTGCCCTTTGACAGGCTCCCTCCTTGACAGCTGGTCCCACTGCCGGCCCT 350
351 GGCTTCACCTGAATACCCCTTTGAGGTTGATGCCACCGCGCTGGTTCCAG 400
1 .....GACAACGTTGCGGACCTGGTAGTGGTGGGCGCTGGC 36
|||||
401 GACACTCAACCCGAGACAATGTTGCCGACGTTGGTGGTGGGCGCTGGC 450
37 TTGAGCGGTTTGGAGACGGCACGCAAGTCCAGGCTGCCGCTCTGTCTCTG 86
|||||
451 TTGAGCGGTTTGGAGACGGCACGCAAGTCCAGGCTGCCGCGCTGTCTCTG 500
87 CCTCGTTCTTGAGGCGATGGATCGTGTAGGGGGAAAGACTCTGAGCGTAC 136
|||||
501 CCTCGTTCTTGAGGCGATGGATCGTGTGGGGGAAAGACTCTGAGCGTAC 550
137 AATCGGGTCCCGGCAGGACGACTATCAACGACCTCGGCGCTGCGTGGATC 186
|||||
551 AATCGGGTCCCGGCAGGACGCTATCAATGACCTCGGCGCTGCGTGGATC 600
187 AATGACAGCAACCAAAGCGAAGTATCCAGATTGTTTGAAGGATTTTCAATT 236
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601 AATGACAGCAACCAAGCGAAGTATTCAAATTATTGAAAGATTTCATT 650  
237 GGAGGCGAGCTCCAGAGGACGACTGGAAATTCAATCCATCAAGCACAG 286  
651 GGAGGCGAGCTCCAGAGGACGACCGGAAATTCAATCCATCAAGCACAG 700  
287 ACGGTACAACCACTACAGCTCCTTATGGTGACTCCTTGCTGAGCGAGGAG 336  
701 ACGGTACAACCACTACAGCTCCTTATGGTGATTCCCTGCTGAGCGAGGAG 750  
337 GTTGCAAGTGCACTTGCCGAACCTCCTCCCCGTATGGTCTCAGCTGATCGA 386  
751 GTTGCAAGTGCACTTGCCGAACCTCCTCCCGCATGGTCTCAGCTGATCGA 800  
387 AGAGCATAGCCTTCAAGACCTCAAGCGGAGCCCTCAGGCGAAGCGGCTCG 436  
801 AGAGCATAGTCTTGAAACACCCCAAGCGGAGCCCTCAAGCGAAGCAGCTCG 850  
437 ACAGTGTGAGCTTCGCGCACTACTGTGAGAAGGAATAAACTTGCCCTGCT 486  
851 ACAGTGTGAGCTTCGCGCACTACTGTGAGAAGGATCTAAGCTTGCCCTGCT 900  
487 GTTCTCGGCGTAGCAAACCAGATCACACGCGCTCTGCTCGGTGTGGAAGC 536  
901 GTTCTCGGCGTGCAAACCAGATCACACGCGCTCTGCTCGGTGTGGAAGC 950  
537 CCACGAGATCAGCATGCTTTTCTCACCGACTACATCAAGAGTGCCACCG 586  
951 CCACGAGATCAGCATGCTTTTCTCACCGACTACATCAAGAGTGCCACCG 1000  
587 GTCTCAGTAATATTTTCTCGGACAAGAAAGACGGCGGGCAGTATATGCGA 636  
1001 GTCTCAGTAATATTTTCTCGGATAAGAAAGACGGTGGGCAGTATATGCGA 1050  
637 TGCAAAACAGGTATGCAGTCGATTGCCATGCCATGTCAAAGGAACTTGT 686  
1051 TGCAAAACAGGTATGCAGTCGATTGCCATGCCATGTCAAAGGAACTTGT 1100  
687 TCCAGGCTCAGTGACACCTCAACACCCCGTCGCTGAAATTGAGCAGTCGG 736  
1101 TCCAGGCTCAGTGACACCTCAACACCCCGTCGCTGAAATTGAGCAGTCGG 1150  
737 CATCCGGCTGTACAGTACGATCGGCTCGGGCGCGCTGTTCCGAAGCAAA 786  
1151 CATCCGGCTGTACAGTACGATCGGCTCGGGCGCGCTGTTCCGAAGTAAA 1200  
787 AAGGTGGTGGTTTTCGTTACCGACAACCTTGATCCACCTTGACATTTTC 836  
1201 AAGGTGGTGGTTTTCGTTACCGACAACCTTGATCCACCTTGATATTTTC 1250  
837 ACCACCTCTTCCCCCGGAGAAGCAAGCATTGGCGGAAAAATCTATCCTGG 886  
1251 ACCACCTCTTCCCCCGGAGAAGCAAGCATTGGCTGAAAAATCTATCCTGG 1300  
887 GCTACTATAGCAAGATAGTCTTCGTATGGGACAAGCCGTGGTGGCGCGAA 936

1301 GCTACTATAGCAAGATAGTCTTCGTATGGGACAAGCCGTGGTGGCGCGAA 1350  
937 CAAGGCTTCTCGGGCGTCCTCCAATCGAGCTGTGACCCCATCTCATTTGC 986  
|||  
1351 CAAGGCTTCTCGGGCGTCCTCCAATCGAGCTGTGACCCCATCTCATTTGC 1400  
987 CAGAGATACCAGCATCGACGTCGATCGACAATGGTCCATTACCTGTTTCA 1036  
|||  
1401 CAGAGATACCAGCATCGAAGTCGATCGGCAATGGTCCATTACCTGTTTCA 1450  
1037 TGGTCCGAGACCCCGGACGGGAAGTGGTCCCAACAGTCCAAGCAGGTACGA 1086  
|||  
1451 TGGTCCGAGACCCCGGACGGGAAGTGGTCCCAACAGTCCNAGCAGGTACGA 1500  
1087 CAAAAGTCTGTCTGGGACCAACTCCGCGCAGCCTACGAGAACGCCGGGGC 1136  
|||  
1501 CAGAAGTCTGTCTGGAACCAACTCCGCGCAGCCTACGAGAACGCCGGGGC 1550  
1137 CCAAGTCCCAGAGCCGGCCAAAGTGCTCGAATCGAGTGGTCAAGCAGC 1186  
|||  
1551 CCAAGTCCCAGAGCCGGCCAAAGTGCTCGAATCGAAGTGGTCAAGCAGC 1600  
1187 AGTATTTCCAAGGAGCTCCGAGCGCGCTCTATGGGCTGAACGATCTCATC 1236  
|||  
1601 AGTATTTCCAAGGAGCGCCGAGCGCTCTCTATGGGCTGAACGATCTCAAC 1650  
1237 ACACTGGGTTCGGCGCTCAGAACGCCGTTCAAGAGTGTTCATTTCGTTGG 1286  
|||  
1651 ACACTGGGTTCGGCGCTCAGAACGCCGTTCAAGGTTGTTCATTTCGTTGG 1700  
1287 AACGGAGACGTCTTTAOTTTGCAAGGGTATATGGAAGGGGCCATACGAT 1336  
|||  
1701 AACGGAGACGTCTTTGOTTTGGAAGGGTATATGGAAGGGGCCATACGAT 1750  
1337 CGGGTCAACGAGGTGCTGCAGAAAGTTGTGGCTAGCCTGGTGCCAGCAGCA 1386  
|||  
1751 CCGGTCAACGAGGTGCTGCAGAAAGTTGTGGCTAGCCTGGTGCCAGCAGCA 1800  
1387 TAG 1389  
|||  
1801 TAG 1803